MAHISHADAL RAJ COLLEGE
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NAAC Accredited 'A' Grade College
DST (FIST) Govt. Of India approved College, NSDC Training Partner
Estd. : 1946
Mahishadal : Purba Medinipur Phone STD 03224 No. 240220

Ref. No..... Date:

ADD ON COURSE 2019-20

Organised by Department Zoology

Topic: Microscopy

Add on course summary:

REPORT:

Name of the course- Microscopy

Course coordinator: *Dr. Shubhamoy Das*, (Associate Professor, HOD, Department of Zoology , Mahishadal Raj College)

Date of commencement: 09.09.2019

Date of completion: - 25.09.2019

Number of participant enrolled: 30

Total duration day: 15

Total duration hour: 30

Evaluation method:- Paper pen MCQ and practical work

RESULT DETAILS:-

Number of student participate in this program: 30

Number of student completes this program: 29

Number of student got certificate in this program: 29

Name of the course: Microscopy

Course coordinator: *Dr. Shubhamoy Das*, (Associate Professor, HOD, Department of Zoology , Mahishadal Raj College)

Microscopy

- **About the course:**

  Light microscopy has become one of the most useful tools in the life sciences. Microscopes are very complex pieces of equipment, that have evolved to accommodate many different imaging techniques. Microscopy and its applications have promoted many key breakthroughs in life sciences. Its impact can be seen by the numerous Nobel prizes in Physics, Chemistry and Physiology and Medicine, that have been attributed to the development of new microscopy applications and techniques, or from discoveries that were possible due to microscopy breakthroughs. This course helps the basics of optics, proceeds through transmitted light microscopy, covers the various methods of imaging fluorescent samples, describes how cameras work and image processing, and concludes with some of the latest advances in light microscopy. In addition to lectures, we also provide labs, so as to cover pragmatics of how to use microscopes.

- **Learning outcomes:**

  Completing a microscopy course can open up various job opportunities in fields related to microscopy and imaging. A microscopy course typically provides comprehensive training in the principles, techniques, and applications of microscopy. These courses are designed to equip students with the knowledge and skills needed to operate various types of microscopes, analyze microscopic samples, and understand the underlying principles of microscopy. Job opportunities in microscopy may be found in image specialist, research scientist, clinical laboratory technologist, pathologists assistant, quality control specialist, forensic scientist, biotechnologist, education and training, museum or conservation specialist.

- **Target audience:**

  Students of science background (UG & PG), Researcher, and faculty members. Environmental Studies student may also participate.

- **Course content overview:**

  At the completion of this course, participants should be able to:

  - Identify the major components of the microscope and their function
  - Identify how to maintain a microscope
  - Discuss the role of fluorescent in microscopy
  - Describe the process to correctly focus on the appropriate field of view
  - Use the ocular micrometer to measure an object under the microscope
  - Demonstrate the ability to troubleshoot encountered problems with the microscope

- **Schedule:** Total 30 hours

DAY	SCHEDULE
Day 1	Basics of Microscopy. History of microscope. (2 hours)
Day 2	Components of different microscope and how its work. (T + P) (2 hours)
Day 3	Resolution of Microscope (T + P) (2 hours)
Day 4	Different types of microscopes, including optical, electron, and scanning probe microscopes, and their applications. (T + P) (2 hours)
Day 5	Explore various microscopy techniques, such as brightfield microscopy, phase-contrast microscopy, fluorescence microscopy, and more. (T + P) (2 hours)
Day 6	Principles of Phase contrast. (T + P) (2 hours)
Day 7	Methods, cell, tissue sample preparation. (T + P) (2 hours)
Day 8	Phase contrast image analysis and interpretation. (T + P) (2 hours)
Day 9	Image acquisition and processing, emphasizing techniques to enhance image quality and clarity. (T + P) (2 hours)
Day 10	Principles of Fluorescence microscopy (Fluorescent dyes and proteins, and selection of Fluorescent Probes). (T + P) (2 hours)
Day 11	Tissue or cell preparation for fluorescence microscopy. (T + P) (2 hours)
Day 12	Fluorescence Microscopy based methods to study SF 1 protein in Tricogaster fish. (T + P) (2 hours)
Day 13	Image analysis and interpretation 1. (T) (2 hours)
Day 14	Basic of SEM and TEM. (2 hours)
Day 15	Overall discussion. Doubts clear and revision (2 hours)

Detail Work Schedule

Date	Day	Contents	Time	Duration	Experts	Designation
09.09.19	1	Basics of Microscopy. History of microscope	12 to 2pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
10.09.19	2	Components of different microscope and how its work. (T + P)	1 to 3 pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
11.09.19	3	Resolution of Microscope (T + P)	3 to 5pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
12.09.19	4	Different types of microscopes, including optical, electron, and scanning probe microscopes, and their applications. (T + P)	03 to 05pm	2	Prof.Manik Das	SACT Mahishadal Raj College
13.09.19	5	Explore various microscopy techniques, such as brightfield microscopy, phase-contrast microscopy, fluorescence microscopy, and more. (T + P)	02 to 04pm	2	Prof.Manik Das	SACT Mahishadal Raj College
14.09.19	6	Principles of Phase contrast. (T + P)	01 to 03pm	2	Prof.Saheli Maiti	SACT Mahishadal Raj College
16.09.19	7	Methods, cell, tissue sample preparation. (T + P)	03 to 05pm	2	Prof. Saheli Maiti	SACT Mahishadal Raj College
17.09.19	8	Phase contrast image analysis and interpretation. (T + P)	02 to 04pm	2	Prof. Saheli Maiti and Prof. Sagnik Mondal	SACT Mahishadal Raj College
18.09.19	9	Image acquisition and processing, emphasizing techniques to enhance image quality and clarity. (T + P)	02 to 04pm	2	Prof. Moumita Jana	SACT Mahishadal Raj College
19.09.19	10	Principles of Fluorescence microscopy (Fluorescent dyes and proteins, and selection of	01 to 03pm	2	Prof.Rajkumar Guchhait	SACT Mahishadal Raj College

		Fluorescent Probes) (T + P)				
20.09.19	11	Tissue or cell preparation for fluorescence microscopy. (T + P)	02 to 04pm	2	Dr. Rajkumar Guchhait and Prof. Sagnik Mandal	SACT Mahishadal Raj College
21.09.19	12	Fluorescence Microscopy based methods to study SF 1 protein in Tricogaster fish. (T + P)	01 to 03pm	2	Dr. Rajkumar Guchhait and Prof. Sagnik Mandal	SACT Mahishadal Raj College
23.09.19	13	Image analysis and interpretation 1. (T+P)	01 to 03pm	2	Dr. Rajkumar Guchhait	SACT Mahishadal Raj College
24.09.19	14	Basic of SEM and TEM.	01 to 03pm	2	Dr.Subhamoy Das,	HOD, Zoology, MRC,
25.09.19	15	Evaluation, valediction, feedback Overall discussion.	12 to 2 pm	2	Dr. Subhamoy Day, Dr. Rajkumar Guchhait, Prof. Sagnik Manadal, Prof. Manik Das and Prof. Moumita Jana. DR.Asim Kr Bera	HOD & SACT., Zoology; Principal, MRC
				30 hours		

- **Course structure and examination scheme:**

Course name	Theory classes (hr.)	Practical classes (hr.)	Theory marks	Practical marks	Total marks
Microscopy	15	15	40	10	50

- **Participant's Details and attendance:**

Enrolment Details of Students

Sl. No.	Class	Roll No.	Name	Signature
1.	PG 1st Sem	5180038	Monoj Shee	
2.	PG 1st Sem	5180039	Suchanda Maity	
3.	B. Sc.,(HONS)	2170610	TAMALIKA DAS	
4.	B. Sc. (HONS)	2170025	MAMPA DAS	
5.	B. Sc.,(HONS)	2170032	SANGITA ADHIKARY	
6.	B. Sc.,(HONS)	2170278	AMIT PRAMANIK	
7.	B. Sc. General	2180447	NAIMA AKTAR	
8.	B. Sc. Generic	2180198	SOUMYATTAM BERA	
9.	B. Sc.,(HONS)	2170280	SK . MUSTANGIR	
10.	B. Sc.,(HONS)	2170285	SUDIP DAS	
11.	B. Sc.,(HONS)	2170287	BITHI BERA	
12.	B. Sc.,(HONS)	2170289	SRABANTI MISTRI	
13.	B. Sc.,(HONS)	2170298	NAMITA BERA	
14.	B. Sc. General	2180458	SOUMYADIP PANDA	
15.	B. Sc. Generic	2180531	SUTALIKA MAITY	
16.	B. Sc.,(HONS)	2170300	RAHUL ROY	
17.	B. Sc. General	2180474	PAPIYA MAITY	
18.	B. Sc. Generic	2180333	SHUVASIS KUNDU	
19.	B. Sc.,(HONS)	2170302	TINA JANA	
20.	B. Sc.,(HONS)	2170303	MOUSUMI GHORAI	
21.	B. Sc. General	2180475	JAYASHREE BHOWMIK	
22.	B. Sc. Generic	2180543	PARAMITA MAJI	
23.	B. Sc.,(HONS)	2170304	ARNAB DAS	

24.	B. Sc.,(HONS)	2170307	RESHMA KHAN	
25.	B. Sc.,(HONS)	2170311	PABITRA PATRA	
26.	B. Sc.,(HONS)	2170312	SHRABANTI PRAMANIK	
27.	B. Sc.,(HONS)	2170322	SUPRIYA GIRI	
28.	B. Sc.,(HONS)	2170342	SUVENDU DAS	
29.	B. Sc.,(HONS)	2170347	RESHMA KHATUN	
30.	B. Sc.,(HONS)	2170348	TRISHA MANDAL	

Add on course- 2019-2020

Organized by Department Zoology

Topic: - Microscopy

Attendance Record (Day1-Day 8)

Sl. No.	Name of Students	09.09.19	10.09. 19	11.09. 19	12.09. 19	13.09. 19	14.09. 19	16.09. 19	17.09. 19
1.	MONOJ SHEE								
2.	SUCHANDA MAITY								
3.	TAMALIKA DAS								
4.	MAMPA DAS								
5.	SANGITA ADHIKARY								
6.	AMIT PRAMANIK								
7.	NAIMA AKTAR								
8.	SOUMYATTAM BERA								
9.	SK . MUSTANGIR								
10.	SUDIP DAS								
11.	BITHI BERA								
12.	SRABANTI MISTRI								
13.	NAMITA BERA								
14.	SOUMYADIP PANDA								
15.	SUTALIKA MAITY								
16.	RAHUL ROY								
17.	PAPIYA MAITY								
18.	SHUVASIS KUNDU								
19.	TINA JANA								
20.	MOUSUMI GHORAI								
21.	JAYASHREE BHOWMIK								

22.	PARAMITA MAJI								
23.	ARNAB DAS								
24.	RESHMA KHAN								
25.	PABITRA PATRA								
26.	SHRABANTI PRAMANIK								
27.	SUPRIYA GIRI								
28.	SUVENDU DAS								
29.	RESHMA KHATUN								
30.	TRISHA MANDAL								

Attendance Record (Day9-Day 15)

Sl. No.	Name of Students	18.09.19	19.09.19	20.09.19	21.09.19	23.09.19	24.09.19	25.09.19
1.	MONOJ SHEE							
2.	SUCHANDA MAITY							
3.	TAMALIKA DAS							
4.	MAMPA DAS							
5.	SANGITA ADHIKARY							
6.	AMIT PRAMANIK							
7.	NAIMA AKTAR							
8.	SOUMYATTAM BERA							
9.	SK . MUSTANGIR							
10.	SUDIP DAS							
11.	BITHI BERA							
12.	SRABANTI MISTRI							
13.	NAMITA BERA							
14.	SOUMYADIP PANDA							
15.	SUTALIKA MAITY							
16.	RAHUL ROY							
17.	PAPIYA MAITY							
18.	SHUVASIS KUNDU							
19.	TINA JANA							
20.	MOUSUMI GHORAI							
21.	JAYASHREE BHOWMIK							
22.	PARAMITA MAJI							

23.	ARNAB DAS							
24.	RESHMA KHAN							
25.	PABITRA PATRA							
26.	SHRABANTI PRAMANIK							
27.	SUPRIYA GIRI							
28.	SUVENDU DAS							
29.	RESHMA KHATUN							
30.	TRISHA MANDAL							

Sample Question of Examination

2019/Add On Course/ Examination

ADD ON COURSE

Department of Zoology & Computer Science, Mahishadal Raj College

Microscopy

Full Marks: 50 **Time: 2 hrs**

The figures in the right-hand margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.
Illustrate the answers wherever necessary.

A. Answer the following MCQ : 15x2=30

1. Which part of the compound microscope helps in gathering and focusing light rays on the specimen to be viewed?
   a) Eyepiece lens
   b) Objective lens
   c) Condenser lens
   d) Magnifying lens
2. What is the minimum distance for the eye to focus on any object?
   a) 11 cm
   b) 25 cm
   c) 32 cm
   d) 4 2 cm
3. Resolving power of a microscope is a function of _____
   a) Wavelength of light used
   b) Numerical aperture of lens system

8. In light microscopy, which of the following is used as fixatives prior to staining technique?
   a) Osmic acid
   b) Glutaraldehyde
   c) Heat
   d) Osmic acid, glutaraldehyde, heat
9. In Phase contrast microscopy, the rate at which light enters through objects is _____
   a) Constant
   b) Inversely proportional to their refractive indices
   c) Directly proportional to their refractive indices
   d) Exponentially related to their refractive indices
10. Which part of the light microscope controls the intensity of light entering the viewing area?
    a) Coarse adjustment screw
    b) Fine adjustment screw
    c) Diaphragm
    d) Condenser lens
11. You place a specimen under the microscope and notice that parts of the specimen begin to emit light immediately. These materials can be described as _____.
    a) Fluorescent
    b) Phosphorescent
    c) Transparent
    d) opaque
12. Who is the probable inventor of the compound microscope?
    a) Girolamo Fracastoro
    b) Zaccharias Janssen
    c) Antonie van Leeuwenhoek
    d) Robert Hooke

13. Which would be the best choice for viewing internal structures of a living protist such as a *Paramecium*?
    a) a brightfield microscope with a stain
    b) a brightfield microscope without a stain
    c) a darkfield microscope
    d) a transmission electron microscope

14. Which type of microscope is especially useful for viewing thick structures such as biofilms?
    a) a transmission electron microscope
    b) a scanning electron microscopes
    c) a phase-contrast microscope
    d) a confocal scanning laser microscope

15. Which type of microscope would be the best choice for viewing very small surface structures of a cell?

a) a transmission electron microscope
b) a scanning electron microscope
c) a brightfield microscope
d) a darkfield microscope

B. Answer the following MCQ : 10x1=10

Write the principle of Phase contrast and fluorescence microscopy and application of its. 10

- ***SAMPLE CERTIFICATE OF COURSE COMPLETION***


CERTIFICATE
OF COURSE COMPLETION
THIS IS TO CERTIFY THAT
Subhada Shankar Mondal
has successfully completed the Add-on Course on Water and soil analysis
held during 2018-19 academic year at Mahishadal Raj College.
Course Co-ordinator
IQAC Co-ordinator
Principal
DATE: 06.09.2019


CERTIFICATE
OF COURSE COMPLETION
THIS IS TO CERTIFY THAT
Soumitra Chatterjee
has successfully completed the Add-on Course on Water and soil analysis
held during 2018-19 academic year at Mahishadal Raj College.
Course Co-ordinator
IQAC Co-ordinator
Principal
DATE: 06.09.2019